REMARKS

This application has been reviewed in light of the Office Action dated May 20, 2003. Claims 1-11 and 30-48 are now presented for examination. Previously non-elected Claims 12-29 have been canceled, without prejudice or disclaimer of subject matter. Claims 1, 6, and 8-11 have been amended to even further clarify the claimed subject matter. Claims 30-48 have been added to provide Applicants with a more complete scope of protection. Claims 1, 10, 11, 33, 37, and 45 are in independent form. Favorable reconsideration is requested.

Initially, the drawings were objected to for the reasons set forth in the Form PTO-948 attached to the Office Action. Submitted herewith is a complete set of formal drawings, including the relevant corrected drawings which are believed to comply fully with the requirements set forth in the Form PTO-948. Entry of these drawings is respectfully requested, as is withdrawal of the objections set forth in the Form PTO-948.

Claim 1 was objected to for the reason given in paragraph 1 of the Office Action. Without conceding the propriety of this objection, Claim 1 has been amended in a manner which renders the objection moot. Accordingly, withdrawal of the objection is respectfully requested.

Claims 1, 2, 7, 8, and 11 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent 6,008,916 (Khaleghi). Claims 1, 3-6, and 11 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent 5,265,096 (Parruck). Claim 9 was rejected under 35 U.S.C. § 103(a) as obvious over Khaleghi.

As amended, independent Claim 1 is directed to a wavelength division multiplexed optical system, comprising a first optical node including a transponder having a test

signal generator for generating a test signal, a second optical node including a transponder having a monitoring circuit for monitoring a received test signal, and a light path through which at least optical communications normally are exchanged between the first and second optical nodes. The light path is tested by the monitoring circuit monitoring a quality of the test signal in response to receiving the test signal from the first optical node through the light path.

Independent Claim 11 is directed to a wavelength division multiplexed optical system, comprising an optical node including a transponder having a test signal generator for generating a test signal, client equipment including a monitoring circuit for monitoring a received test signal, and an optical path through which at least optical communications normally are exchanged between the optical node and the client equipment. The optical path is tested by monitoring a quality of the test signal generated by the test signal generator of the optical node and received by the monitoring circuit of the client equipment through the optical path.

Khaleghi relates to a distortion penalty measurement technique which separates the contribution of distortion from the contribution of noise in a bit error rate (BER). At col. 6, lines 53-67, Khaleghi refers to determining a distortion-free Q using a distortion measurement unit (DMU) 1 connected as shown in Fig. 2B. By replacing a link 100 with DMU 1, distortion introduced in link 100 is eliminated from the measurement, and the only errors introduced in the measurement are due to noise. A test signal output by a signal generator 34 is applied to a modulating input 21 of a transmitter, rather than an information signal. The test signal is passed through DMU 1 rather than through link 100, in this portion of the technique, and the BER is measured at a receiving end (see, col. 7, lines 1-6).

In a step 3, the BER for a channel 1 is measured on an output 17 with a

measuring unit 33 under "normal conditions of operation of the system, with traffic on all channels." (Col. 7, lines 17-20). The BER comprises errors due to noise and errors due to distortion cumulated along the entire transmission path. In a step 4, a BER comprising error information on the errors (noise and distortion) introduced by a transmitter-receiver pair and noise introduced by link 100 is measured using the DMU 1 connected as in Fig. 2B. This time the information signal is applied on the modulating input 21 of the transmitter rather than the test signal from generator 34, and the applicable BER is measured on output 17 with unit 33. (See, e.g., col. 7, lines 25-50).

It is respectfully submitted that, even if Khaleghi be deemed to refer to forwarding a non-test information signal through a link 100 or an alternate route including DMU 1, and forwarding a test signal through only the alternate route including DMU 1, to obtain BERs, nothing has been found, or pointed out, in Khaleghi that would teach or suggest a light path through which at least optical communications normally are exchanged between first and second optical nodes, wherein the light path is tested by a monitoring circuit of the second optical node monitoring a quality of a test signal generated by a test signal generator of the first optical node, in response to receiving the test signal from the first optical node through the light path, as recited in Claim 1. Neither is Khaleghi seen to teach or suggest testing an optical path through which optical communications normally are exchanged by monitoring a quality of a test signal generated by a test signal generator of an optical node and received by a monitoring circuit of client equipment through the optical path, as recited in Claim 11.

Parruck refers to failure detection circuitry utilized to detect a loss of signal, a loss of frame, a loss of pointer, and incoming alarm indication signals. (Col. 5, lines 16-19).

When receive circuitry 20 in a receiving portion of a device 10b detects and then indicates a failure condition, and alarm control signal introduction circuit 30 responds by inserting an internal alarm control signal into at least one predetermined transport overhead timeslot of a SONET signal. (Col. 5, lines 27-31). An internal alarm detect circuit 45 of a transmitting portion of the device 10b later detects the internal alarm control signal in the SONET signal, and then provides a control signal to an outgoing SONET alarm circuit 50, which provides an outgoing SONET alarm. That alarm is multiplexed by a multiplexer 55 with a signal provided by transmit circuit 40 under the control of circuit 45 to provide an outgoing SONET signal 57. The Parruck system requires electro-optical conversion.

The Office Action asserts that the outgoing SONET alarm circuit 50 of Parruck corresponds to the test signal generator recited in Claim 1. However, the circuit 50 is seen merely to provide the outgoing SONET alarm in response to the control signal issued from circuit 45 (in response to the circuit 45 determining that an internal alarm originally detected in the transmitting portion has been generated). That is, in Parruck the failure condition is first detected by the receive circuitry 20, *and then*, as a subsequent result, the circuit 50 provides an outgoing SONET alarm after being notified of the failure condition. However, nothing has been found, or pointed out, in Parruck that would teach or suggest a wavelength division multiplexed optical system comprising components as recited in Claim 1, including a first optical node including a *test signal generator for generating a test signal*, a second optical node including a monitoring circuit for monitoring a received test signal, and a light path through which at least optical communications normally are exchanged between the first and second optical nodes, wherein the light path is tested by the monitoring circuit monitoring a quality of the test signal *in response to*

receiving the test signal from the first optical node through the light path (emphasis added). Neither is Parruck seen to teach or suggest a wavelength division multiplexed optical system comprising components as recited in Claim 11, including an optical node having a *test signal generator for generating a test signal*, client equipment including a monitoring circuit for monitoring a received test signal, and an optical path through which at least optical communications normally are exchanged between the optical node and client equipment, wherein the optical path is tested by monitoring a quality of the test signal generated by the test signal generator of the optical node and received by the monitoring circuit of the client equipment through the optical path.

For the foregoing reasons, Claims 1 and 11 are each deemed clearly patentable over Khaleghi and Parruck, and thus withdrawal of the rejections of Claims 1 and 11 is respectfully requested.

Claim 10 was rejected under 35 U.S.C. 102(b) as anticipated by U.S. Patent 5,367,395 (Yajima et al.).

As amended, Claim 10 is directed to an optical line terminal comprising a transponder having at least a transmitter and a receiver, a test signal generator for generating a test signal, and a monitoring circuit connected to the receiver for monitoring a received test signal at an input of the receiver. The transmitter transmits signals applied to an input thereof, from the optical line terminal, and the optical line terminal also comprises a switch that is operable for either coupling a signal output by the receiver to the input of the transmitter, or coupling the test signal to the input of the transmitter.

Yajima et al. relates to a communication system in which faults are detected

using a single optical path according to Synchronous Digital Hierarchy (SDH) or Plesiochronous Digital Hierarchy (PDH). In Yajima et al., stations 10 and 12 are connected through a single optical fiber 14, and each station includes a multiplexer 16 for multiplexing plural digital signals into a high speed digital signal, a demultiplexer 18 for performing a reverse operation of multiplexer 16, and an optical sending unit 20 for converting an electrical signal into an optical signal to be transmitted through the fiber 14. An optical receiving unit 22 converts the optical signal into the electrical signal, and an optical coupler 24 injects the optical signal to be transmitted into the fiber 14 and separates the received optical signal from the fiber 14.

In a normal operation, switches 30, 34, 36, and 38 are set as shown in Fig. 1. In a loopback test, the optical switches 36 and 38 are opened and a test is executed separately in the stations 10 and 12. When signal interruption occurs in the normal connection shown in Fig. 1, the loopback test is executed in station 10 in a step 100 by opening the switch 36 and inserting an inverter 28. In a step 102, if the optical signal output from the station itself is not normally received, it is decided that the station 10 is experiencing a fault. If the signal is normally received, the loopback test is executed in the station 12 in a step 104. In a step 106, if the signal output from the station itself is not normally received, it is decided that the station 12 is experiencing a fault. If the signal is normally received, it is decided that the optical path 14 is experiencing a fault.

The Office Action asserts that element 24 of Yajima et al. is a "switch means . . . for connecting the output of the transmitter to the input of the receiver to test a quality of the test signal transmitted by the transmitter and received by the receiver." However, element 24 is seen to be merely a coupler for injecting an optical signal to be transmitted into the optical fiber

14 and for separating a received optical signal from the optical fiber 14. Nothing has been found, or pointed out, in Yajima et al. that would teach or suggest an optical line terminal as set forth in Claim 10, including a switch that is operable for either coupling an output of a receiver to an input of a transmitter, or coupling a generated test signal to the input of the transmitter.

For this reason, Claim 10 is deemed clearly patentable over Yajima et al., and thus withdrawal of the rejection of Claim 10 is respectfully requested.

Added independent Claim 33 recites a wavelength division multiplexed optical communication system having an optical path through which optical communications normally are communicated. At least one optical node of the system comprises a transmitting portion arranged to transmit a generated test signal through the optical path, and a receiving portion arranged to receive the test signal from the transmitting portion through the optical path, and to monitor a quality of the test signal received through the optical path, without requiring a conversion of the test signal to or from a non-optical form. The test signal is an optical signal.

For reasons substantially the same as those given above in connection with Claim 1, neither Khaleghi nor Parruck is seen to teach or suggest transmitting a generated test signal through an optical path through which optical communications normally are communicated, and monitoring a quality of the test signal received through the optical path, as set forth in Claim 33.

As described above, Yajima et al. discloses a communication system in which faults are detected using a single optical path according to Synchronous Digital Hierarchy (SDH) or Plesiochronous Digital Hierarchy (PDH), and wherein electro-optical and optical-electrical conversions are performed in the units 20 and 22, respectively. However, nothing has been

found, or pointed out, in Yajima et al. that would teach or suggest a wavelength division multiplexed optical communication system in which a generated test signal is transmitted through an optical path and then monitored for quality after receipt, without requiring a conversion of the test signal to or from a non-optical form, as set forth in Claim 33.

For these reasons, Claim 33 is believed to be clearly patentable over each of Khaleghi, Parruck, and Yajima et al.

Added independent Claim 37 recites a method for operating a wavelength division multiplexed optical communication system. The method comprises transmitting a generated test signal from a first optical node to a second optical node by way of a light path through which at least optical communications normally are exchanged between the first and second optical nodes, and determining if there is a fault condition in the light path based on a quality of the test signal received at the second optical node.

For reasons substantially similar to those given above in connection with Claim 1, it is respectfully submitted that neither Khaleghi nor Parruck is seen to teach or suggest these features of Claim 37.

As described above, Yajima et al. refers to a normal operation in which switches 36 and 38 are configured as shown in Fig. 1, for allowing communication between stations 10 and 12. However, nothing in that reference is seen to teach or suggest a method for operating a wavelength division multiplexed communication system, in which a generated test signal is transmitted between optical nodes by way of a light path through which at least optical communications normally are exchanged, to determine if there is a fault condition in the light path, as set forth in Claim 37.

For these reasons, Claim 37 is believed to be clearly patentable over each of Khaleghi, Parruck, and Yajima et al.

Independent Claim 45 is a method claims that corresponds in many relevant respects to Claim 33 discussed above, and also is believed to be clearly patentable over each of Khaleghi, Parruck, and Yajima et al. for substantially the same reasons as is Claim 33.

A review of the other art of record has failed to reveal anything which is seen to remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration or reconsideration, as the case may be, of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York office by

telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

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